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June 7, 2000

Mr. Mike Craven
Southern Nuclear Company
42 Inverness Center Parkway
Bldg. 40
Birmingham, Alabama 35242

Reference: NUPIC Audit of Holtec

Subject: Cause, Corrective Actions, Action to Prevent Recurrence and Extended Condition Evaluations to Findings Identified During the NUPIC Audit

Dear Mike:

During the NUPIC audit of Holtec from May 22-26, 2000, NUPIC identified several findings related to fabrication work performed by Omni Fabricators and design work at Holtec. These findings have been input into Holtec's corrective action program and cause, corrective action, actions to prevent recurrence and extended condition evaluations have been determined. Below is a summary of the results along with documented evidence of corrective action implementation where appropriate.

Finding #1:

The following discrepancies were found by NUPIC's weld engineer on weld procedures WPS 83 and WPS 86. 1) Tensile specimens for the PQRs incorrectly identified the width dimensions of the test specimen as a diameter, which resulted in an incorrect ultimate tensile strength value. 2) WPS 83 and PQR 83A specify the use of E308LT1-1 weld material. The gas used for qualification is 75% argon and 25% CO₂. SFA 5.22 of ASME Section IIC requires that the AWS classification for use of this gas should be E308LT1-4. 3) The test reports do not specify the order of specimen removal.

m-b
[Signature]



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Cause (including root causes)

- 1) For discrepancy 1, the tensile test discrepancy was caused by a typographical error by Holtec's approved test lab. The width dimension of the test specimen was incorrectly input as a diameter dimension, which resulted in an inaccurate calculation. This test data was copied directly onto the Omni PQR.
- 2) For discrepancy 2, the identification of the incorrect weld material was a typographical error. The gas to AWS classification specified by SFA 5.22 was overlooked during the development of the weld procedure.
- 3) For discrepancy 3, please see response in corrective action 2).

Corrective Actions:

- 1) The weld procedures and procedure qualification records have been revised to correct typographical errors identified in discrepancies 1) and 2) above. These weld procedures were subsequently submitted to a third party weld engineer and several additional minor changes to the procedures were required (no impact on previous work). Copies of the revised weld procedures, procedure qualification records and the revised specimen test reports are included.
- 2) For item 3) there is no requirement in ASME Section IX to specifically certify to the order of removal. The test report certifies to ASME Section IX of which QW-462.1a identifies the order of removal. On May 25, 2000, M. Soler of Holtec contacted Rich Bottari (Lab Supervisor) of Ramball and confirmed that the specimens had been removed in the correct order.

Actions to Prevent Recurrence:

- 1) Holtec had previously committed to the HUG group that weld procedures for HI-STORM and HI-TRAC would be reviewed by an appropriately qualified engineer. The two procedures identified above were not included in this since they had already been developed and were in use. All future weld procedures will be reviewed by an appropriately qualified engineer prior to use.



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Extended Conditions:

WPS 83 and 86 were first used on the fuel spacer work for Dresden and have not been used since. Correction of the typographical error showed that the tensile test results are still acceptable and within ASME Section IX Code requirements.

The weld wire used during the fabrication of the fuel spacers was E308LT1-4 and had been tested by the weld wire manufacturer using 75% argon/ 25% CO₂ gas. The 75% argon/25% CO₂ gas mixture was used during fabrication of the fuel spacers.

Based on the above, this finding has no impact on past or present fabrication work.

Finding #2:

No cleanliness or packaging requirements were defined by Holtec to Omni for the Dresden fuel spacers. No independent quality verification of the cleanliness and packaging of each of the items was documented prior to shipping.

Cause (including root causes):

- 1) While Holtec generated procedures for cleanliness, packaging and shipping are available for specific items designed by Holtec (ie. fuel racks, casks), there are no standard procedures developed that can be used for other miscellaneous items. Holtec personnel have previously communicated applicable cleanliness, packaging and shipping requirements to vendors through procurement documents or through verbal instructions.
- 2) Lack of training of Holtec personnel. Personnel were not familiar with QA manual criteria 13 which require that procedures be prepared for cleanliness, storage and shipping of project items.



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Corrective Actions:

- 1) Fuel spacers had been inspected by Omni for cleanliness prior to shipping however no documentation of the inspection was provided. There were signoffs on the travelers from production for cleaning. ANSI N45.2.1, Level B cleanliness criteria were the requirements imposed on Omni. An inspection certification by Omni has been generated. A copy is attached.
- 2) Surveillance by Holtec at Omni included an inspection by Holtec of the first set of cleaned spacers. Holtec confirmed at that time that the cleanliness met ANSI N45.2.1 Level B criteria. An additional surveillance shall be performed by Holtec at the Dresden site prior to fuel loading to provide additional assurance as to the cleanliness of the fuel spacers. Expected completion date: 6/9/00.

Actions to Prevent Recurrence:

- 1) Develop standard cleaning procedure and packaging/shipping procedure that include the applicable requirements from ANSI N45.2.1 and ANSI N45.2.2. Preliminary copies of the procedures have been completed and are attached.
- 2) Incorporate checklist items for cleanliness, packaging and shipping on the QA Requirements Checklist. A copy of the revised checklist is attached.
- 3) Perform training with Holtec personnel. Action completed June 5, 2000. Copy of training E-mail attached.

Extended Conditions:

No other fuel spacers have been fabricated. Components such as lift rigs are typically painted and cleaning is controlled under paint application requirements. Cleaning procedures for racks and HI-STAR components are already in place.

There are no extended conditions.



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Finding #3:

Discrepancies were identified on the traveler packages (PWRP (Production Work Routing Plan), IRDS (Inspection Report Datasheet) for the fuel spacers including the following:

- 1) Unacceptable inspection results were not recorded nor was the SMDR # referenced.
- 2) M&TE traceability numbers were not always recorded on the IRDS
- 3) Applicable ECOs modifying inspection requirements were not listed on the IRDS as a basis for the acceptance of the item
- 4) Uncalibrated M&TE was used to verify thread dimensions.

Additionally, HQP 7.0 (Receipt Inspection Procedure) lacks standard guidance for performing receipt inspection of finished products (i.e., fasteners).

Cause (including root causes):

- 1) The fuel spacers and lift cleat fabrication activities as well as the receipt inspection of raw materials were Omni's first time use of the new system and paperwork. While training was performed prior to the start of work and surveillance was performed by Holtec, a learner's curve is inevitable. Additional training during the implementation of the process to address special situations (ie. how do I document a deviation on the traveler package?) was not provided nor did Omni personnel question Holtec when they were unsure of how to address the situation.

Corrective Actions:

- 1) Holtec has performed a complete review of all traveler packages for the fuel spacers and lift cleats and a review of all receipt inspection records generated to date by Omni. This review included an evaluation of NUPIC's findings as well as a determination as to whether any additional discrepancies were in the packages or receipt inspection records. The results of the review are provided below.



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- a) There were two instances where dimensional discrepancies were identified. In both cases, Omni generated NCRs and SMDRs (Supplier Manufacturing Deviation Requests) were generated and issued back to Omni by Holtec. Therefore, the inspector did perform the necessary actions for the discrepancies and was just unclear as to how to document this on the IRDS.
- b) For M&TE, there are several cases where the inspector only documented the description of the equipment used however since there is a limited number of calibrated M&TE at Omni, traceability back to the piece of equipment is easily determined through the item description. In the case of the uncalibrated thread gages, the item being inspected (fuel spacer bolts) was NITS (not important to safety) per the Holtec TSAR. Holtec was aware of the use of this uncalibrated gage and advised Omni that calibrated gages would be required for some future items but would not be necessary for the particular item being inspected since it was NITS.
- c) In all cases except for one NITS component, the IRDS contained the latest required dimension and therefore the ECO did not need to be referenced on the IRDS. For the NITS component, the original dimension had been crossed out and a new dimension written without reference to the applicable ECO. If the item had been for an ITS (important to safety) component, a revision of the IRDS would have been required. The NITS component was fabricated and inspected to the correct dimension.
- d) The review revealed no additional discrepancies in the traveler packages. Three additional typographical errors on the receipt inspection records were identified and corrected. These errors had no impact on equipment traceability.
- 2) HQP 7.0 has been revised to clarify additional inspection criteria for finished products such as fasteners. A copy of the preliminary revision is attached.
- 3) The finding was reviewed with the Omni QC Manager and Program Manager on 5/31/00.



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- 4). All IRDS and receipt inspection records which contained discrepancies regarding equipment traceability have been corrected.

Actions to Prevent Recurrence:

- 1) Develop a procedure on using the various components of the Omni traveler package (i.e., PWRP, IRDS, ADS, MCDS). A copy of Omni's procedure, which is currently going through a final review process at Holtec, is attached.
- 2) Provide additional training to Omni personnel on travelers. This action was completed by the Omni QC Manager on June 7. A copy of the attendance list is attached.
- 3) Since the completion of the fuel spacer and lift cleat fabrication work at Omni, Omni has hired a QC Manager with over twenty years of QA/QC inspection. The qualifications of the QC Manager were reviewed by the NUPIC team. The QC Manager will provide appropriate oversight and direction as necessary regarding completion of traveler packages.

Extended Conditions:

The fuel spacers and lift cleats were the first ITS components fabricated by Omni. The results of the evaluation performed by Holtec on the completed travelers (see above) show that there is no impact on the fuel spacers supplied to Dresden and that there is no extended condition.

The only finished product inspected under HQP 7.0 by Omni was a NITS bolt. Therefore, there is no impact on the fuel spacers and there are no extended conditions.

Finding #4:

Omni purchase order 1215 for weld qualification testing on WPS 84 & 85 specified that testing include root and face bends. ASME Section IX requires that side bends be used for plate that is 3/4" or more in thickness.



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Cause (including root causes):

- 1) Inattention to detail. The purchase order generated by Omni was a copied from a previous purchase order by Omni for testing of specimens from 5/8" thick plate. Root and face bend tests are permitted for plates under 3/4" thick. The change was to side bends was not corrected.

Corrective Actions:

- 1) Issue new purchase orders with corrected test requirements and supply new weld samples. These activities were completed on May 30, 2000. A copy of the new purchase order is attached.

Actions to Prevent Recurrence:

- 1) None required. See extended condition evaluation.

Extended Conditions:

At the time of the NUPC finding, the weld procedures were in the process of being qualified and had not been used. The inspection agency was at Omni discussing why the failures on the bend tests had occurred. The procedures had not been completed because of the test failures. Therefore there are no extended conditions.

It should be noted that if the tests had passed, the procedures still would have gone through a review by qualified engineers and this error would have been identified.



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Finding #5:

A number of discrepancies were found in analysis reports reviewed by NUPIC. The specific discrepancies are summarized in the preliminary writeup provided by NUPIC at the exit meeting. A copy of the writeup is attached. A number has been given to each discrepancy by Holtec and is marked on the attachment. Each discrepancy is individually addressed below. Cause, corrective actions, actions to prevent recurrence and extended conditions are identified as appropriate.

1) Root Cause: Design basis inconsistencies in client information. See attached E-mail from Evan Rosenbaum.

Corrective Actions: None. There is no impact on the analysis, the report is four years old and the plant is closed.

Actions To Prevent Recurrence: None

Extended Conditions: None.

2) Root Cause: Inattention to detail. Fuel rack analysis has been performed by Holtec in generally the same manner for fifteen years. Since the changes to the NF code have not impacted fuel rack design, personnel neglected to reference the correct code edition in the text.

Corrective Actions: Evaluate all codes used by Holtec in fuel rack design and reconcile the various code editions. This action was completed on May 30, 2000 through Holtec position paper WS-136. This document is considered proprietary and is available for review at Holtec.

Actions To Prevent Recurrence: Provide E-mail training session summarizing this issue to personnel. This action was completed on June 7. A copy is attached.

Extended Conditions: There are no extended conditions based on the evaluation performed under WS-136. All cask work is performed under codes specified in the Holtec TSAR.



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- 3) **Root Cause:** Inattention to detail. The reduction from four tons to three tons was made after the original four ton analysis showed that the platform could not be supported on all fuel racks. After consultation with ComEd, the maximum load used in the analysis was reduced from four tons to three tons. This report was approved by ComEd on 2/9/99 (copy attached). Neither Holtec or ComEd initiated actions to change the specification from 4 tons to 3 tons although the licensing amendment to the USNRC specified three tons.

Corrective Action: Revise specification and submit to ComEd. Action completed on 5/25/00. Copy attached.

Actions To Prevent Recurrence: Provide E-mail training session summarizing this issue to personnel. This action was completed on June 7. A copy is attached.

Extended Conditions: None.

- 4) 200°F is the standard temperature used in all fuel rack analysis and is conservatively based on bulk pool temperatures between 140-170°F. The actual maximum bulk pool temperature for Byron is 166°F assuming back to back discharges. The bulk temperature can be found in the licensing report. Personnel with fuel rack design experience would not need additional guidance as to how 200°F was arrived at, and therefore we do not consider this to be a discrepancy. The analysis report and licensing report have been approved by ComEd.
- 5) A revision to the report was made to satisfy the reviewers comments, however Holtec believes this issue to be a question of engineering judgment, not a discrepancy.
- 6-8,10) Clarifications were added in a revision to the report to satisfy the reviewer, however Holtec believes this issue to be a question of engineering judgment, not a discrepancy.
- 9) These are typographical errors that have no impact on the calculations or conclusions. The errors were corrected in a revision to the report.
- 11-12) A revision to the report was made to address the editorial comments, however Holtec believes this issue to be a question of engineering judgment, not a discrepancy.



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I hope that these responses along with the supporting corrective action documentation will be sufficient to allow NUPIC to close the findings identified during the exit meeting. If you have any questions regarding the responses, please feel free to contact me.

Sincerely,

Mark Soler
Quality Assurance Manager

Attachments:

- 1) WPS 83, 86 & PQR 83A,86A (total pages= 16)
- 2) Cleanliness certification for fuel spacers (total pages=1)
- 3) Cleaning Procedure (total pages= 5)
- 4) Packaging & Shipping Procedure (total pages= 9)
- 5) P.O. QA Attachment (total pages=4)
- 6) E-mail training session on cleanliness and packaging (total pages=2)
- 7) Revised Receipt Inspection Procedure (total pages=7)
- 8) Shop Traveler System Procedure (total pages=15)
- 9) Personnel Training Session on Travelers (total pages=1)
- 10) Purchase order for weld tests (total pages=4)
- 11) NUPIC summary of analysis discrepancies (total pages=4)
- 12) E-mail evaluation of analysis errors from HI-961450 (total pages=1)
- 13) Supporting documentation for overhead platform discrepancy (total pages=9)
- 14) E-mail training session on analysis errors (total pages=1)